

**IN THE ABSTRACT OF THE DISCLOSURE:**

Please replace the abstract with the following new abstract:

**ABSTRACT OF THE DISCLOSURE**

An optical amplifier which amplifies a multiplexed signal light which is multiplexed with a plurality of signals having different wavelengths. The optical amplifier includes an optical amplifying medium which amplifies the multiplexed signal light and outputs amplified multiplexed signal light, a first light separator which separates light having a specific wavelength from at least a part of the multiplexed signal light output from the optical amplifying medium, a first light receiver which inputs the light having the specific wavelength separated by the first light separator and measures a strength of the specific wavelength light, and a controller which controls an output of the optical amplifying medium such that the strength of the specific wavelength light becomes a first predetermined value.